

Before the
Federal Communications Commission
Washington, D.C. 20554

In the matter of)	
)	
Amendment of the)	
Commission's Rules with)	GN Docket No. 12-354
Regard to Commercial)	
Operations in the 3550 to)	
3650 MHz Band)	

**REPLY COMMENTS OF THE WIRELESS INNOVATION FORUM ON THE FEDERAL
COMMUNICATIONS COMMISSION SECOND FURTHER NOTICE OF PROPOSED
RULEMAKING SEEKING COMMENT ON AMENDMENT OF THE COMMISSION'S RULES
WITH REGARD TO COMMERCIAL OPERATION IN THE 3550-3650 MHZ BAND PART
2: DEFINITION OF USE AND SECONDARY MARKETS**

The Wireless Innovation Forum (Forum) is a U.S. based international non-profit organization driving technology innovation in commercial, civil, and defense communications around the world. Forum members bring a broad base of experience in Software Defined Radio (SDR), Cognitive Radio (CR) and Dynamic Spectrum Access (DSA) technologies in diverse markets and at all levels of the wireless value chain to address emerging wireless communications requirements through enhanced value, reduced total life cost of ownership, and accelerated deployment of standardized families of products, technologies, and services.

In its Report and Order establishing rules for the Citizens Broadband Radio Service ("CBRS") in the 3550 MHz band, the Commission observed that "a multi-stakeholder group focused on the complex technical issues raised by this proceeding could provide us with a wealth of valuable insights and useful information."¹ The Wireless Innovation Forum commends the Commission for providing industry the opportunity to develop answers to the questions and issues

¹ FCC 15-47 at Paragraph 416.

raised in the CBRS rules. As the Commission is aware, the Wireless Innovation Forum's Spectrum Sharing Committee ("SSC") was specifically formed to develop the solutions and standards that will encourage rapid development of the CBRS ecosystem, protect incumbent operations, and benefit all potential stakeholders in the band.² And as the Commission is aware, the SSC benefits from participation of a broad based group that includes wireless carriers, network equipment manufacturers, potential SAS Administrators, satellite operators, existing 3650-3700 MHz band licensees, and other parties with an interest in the 3550 MHz band.

The SSC has formed four work groups that work collaboratively to develop the reports, recommendations and standards necessary to establish a commercial CBRS ecosystem. These work groups were presented to the Commission previously and are as follows:

- Work Group 1: Operations and Functional Requirements
- Work Group 2: Security Requirements
- Work Group 3: Protocol Specifications
- Work Group 4: Testing and Certification

In addition, the committee has formed multiple sub-groups/task groups, including a Joint WG1/WG3 architecture group and a FSS Incumbent protection Subgroup under WG1. Participation in these work groups and task groups currently encompasses some 120 participants from over 40 different organizations.

Wireless Innovation Forum is pleased to provide these reply comments to continue the development of flexible sharing rules in the 3.5 GHz band under the Report and Order. These comments reply to a significant number of the initial comments received by the commission under GN Docket 12-354.

² Reference Ex Parte filing dated 26 February 2015

The Forum's comments were developed by a consensus process that included major wireless carriers, equipment and infrastructure suppliers, potential Spectrum Access Service (SAS) providers, Fixed Satellite Services operators, and technology developers. Due to the wide range of organizations participating in this process, we believe they provide the FCC well thought out, practical, compromise positions on many of the key regulatory and technical issues requiring resolution in order for this band to be placed into use. Because of the large number of individual filings in this docket, we have not cited each individual filing to which each component of this reply is applicable. In fact, these comments are applicable, and address at least one issue raised in each of the individual filings.

Please note that the reply comments in this document focus on the questions related to definition of use and secondary markets. The WINNForum has filed separate reply comments related to fixed satellite services.

1 The Commission should adopt a technical definition of “use” for PAL licenses based around licensee-defined protection areas.

In the Report and Order and Second Further Notice of Proposed Rulemaking³, the FCC requests the development of an engineering-based methodology for the definition of “use” of PAL frequencies. Wireless Innovation Forum members request that the Commission adopt a technical definition of “use” for PAL licenses grounded in the same operator-provided definition of protection area which they proposed in the Petition for Reconsideration to the Report and Order.⁴ This definition of “use” fulfills several key functions desirable in such a definition, as well as

³ FCC Report and Order and Second Further Notice of Proposed Rulemaking 15-47, April 21, 2015, paragraph 421

⁴ The area defined as in “use” should be defined by the licensee and may extend outside the containing licensed census tract.

forming a consistent basis for interference protection of incumbents, the treatment of EUD interference, and a basis for the PAL secondary market.

First, such a definition allows the use of a PAL license to serve EUDs outside the bounds of a given license area. The existing PAL protection criterion⁵ requires aggregate emissions to drop to -80 dBm on the service area boundary, regardless of whether there is co-channel PAL needing protection on the other side of that boundary. While the proposed protection changes would not allow a PAL licensee to seek protection outside a service area, they would modify them so that operating a PAL CBSD near the edge of a service area becomes feasible. Given the small size of many census tracts, this offers useful flexibility to PAL licensees. Figure 1 illustrates this for a census tract near Wichita, KS. The green-tinted census tract (census tract borders are shown with heavy lines) contains several deployed CBSDs with their defined protection areas. The red-bordered protection areas would not be acceptable, since they overlap the edge of the service area. However the truncated protection area on the southern border is acceptable, since it does not cross the census tract edge. This allows unprotected operation of EUDs outside the protection area, providing greater flexibility to the PAL licensee in siting CBSDs within the service area when there are no nearby co-channel PAL licensees with whom coordination is required. This provides siting flexibility to both operators in neighboring service areas: if there is no nearby CBSDs, they do not need to worry about siting CBSDs far away from an unserved part of the neighboring census tract boundary.

⁵ FCC Report and Order and Second Further Notice of Proposed Rulemaking 15-47, April 21, 2015, 96.41(d)(1)

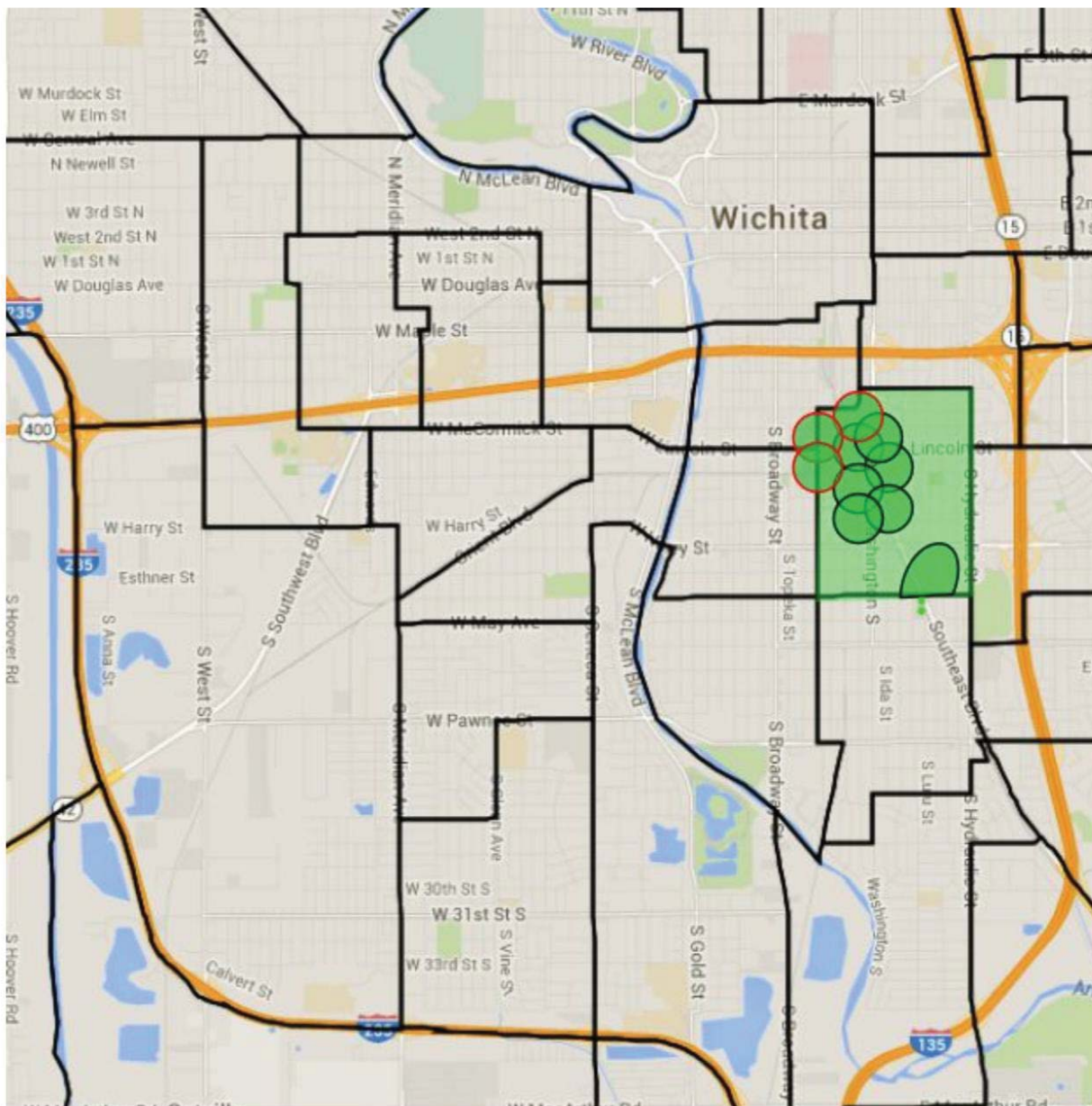


Figure 1. Example PAL protection areas for a single census tract service area

Second, this definition of use allows GAA operators the flexibility to opportunistically deploy within the census tracts contained in a service area in locations far from PAL deployments. While many census tracts are small in size, much of the area of the United States is covered by census tracts large enough that a CBSD operating within the power limits set by the Commission could not possibly provide service to the whole area. A technical definition of use based on

deployments of PAL CBSDs and their associated protection areas provides a sound basis for opportunistic use by GAA of areas unserved by PAL operators. Figure 2 illustrates this case. In this example, a group of census tracts (forming a PAL service area) are tinted blue. There are two dark blue protection areas within that service area. The gray circles are examples of potential co-channel GAA deployments which can either deploy near the edge of the PAL service area, or opportunistically inside it. GAA deployments which are too near the protection areas have red borders. Whether inside or outside the service areas, their emissions violate the -80 dBm protection limits. Note that where no PAL CBSD has defined a protection area, however, operators are free to deploy GAA devices opportunistically. This maximizes the availability of opportunistic use for GAA in a meaningfully large part of the country. Figure 3 illustrates the large area covered by large census tracts with greater than 10 square kilometers area. These areas are the most likely to benefit from the opportunity to deploy GAA opportunistically far from more urban areas where they might be more likely to receive service from PAL operators.

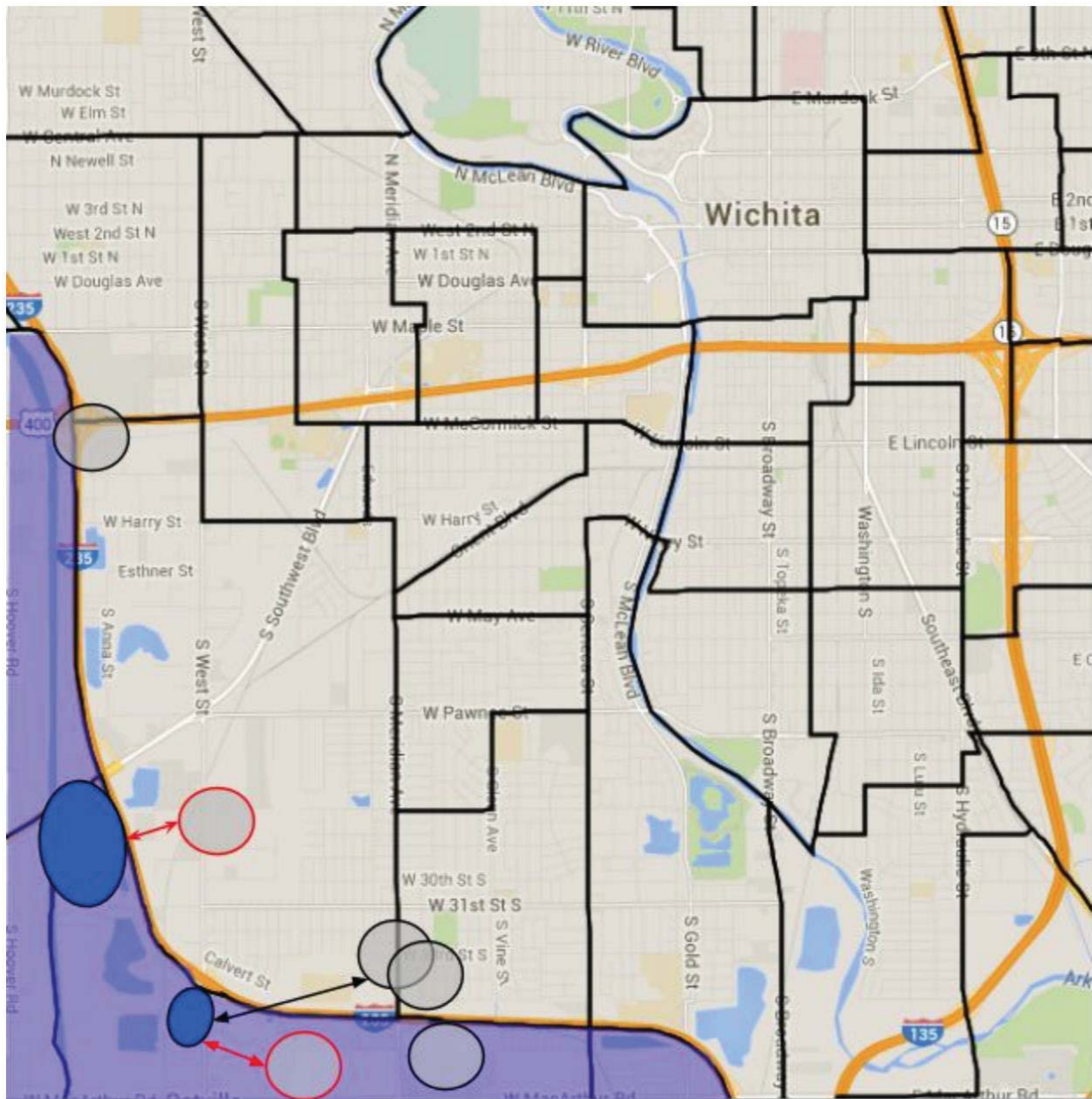




Figure 3. Census tracts in the Midwest United States with an area greater than 10 km².

Third, this definition of “use” is compatible with EUD modeling required for PAL and incumbent protection. The existing protection rules require the SAS to protect federal incumbents⁶ from EUD emissions, and so must have the ability to model the EUD distribution around a particular CBSD. Similarly, Forum members anticipate the FCC choosing to require the SAS to protect other incumbents (FSS and Wireless Broadband Service stations) from EUD emissions as well. Thus the concept of an area encompassing the CBSD and the EUDs with which it is communicating is one the SAS must support regardless. This definition of “use” then applies the same general approach to PAL protection: the protection area set by a PAL operator both defines the area in which EUDs will be operating and in which they need protection, and defines the area in which those EUDs are operating which may offer interference to incumbents or co-channel PAL operators.

Fourth, this protection area definition of use avoids the moment-by-moment problems inherent with a contention-based engineering definition of “use.” A contention-based definition of

⁶ FCC Report and Order and Second Further Notice of Proposed Rulemaking 15-47, April 21, 2015, 96.15(a)(1)

“use” creates difficulties in the ability of a PAL device to provide the QoS levels of service which the operational tier is designed to make possible. If a GAA device is near enough such that it could sense inactivity and begin transmitting co-channel, the PAL device would then almost certainly be receiving interference from that GAA device, and so be required to wait until it had finished before beginning to use the channel. This is incompatible with the technology-independent definition of protection based on received power levels the Commission has adopted in the rules. While there may come to be channel sensing technologies which would assist in PAL licensees being able to cooperatively time share with GAA while still receiving priority, the Commission should not require PAL licensees to adopt such technology. Should they choose to, the rules give PAL licensees the freedom to utilize such technologies by setting alternative power protection limits in the SAS for those devices which also utilize such technology.

Fifth, this definition of “use” is consistent with the anticipated protection strategy for Wireless Broadband licensees. In the Report and Order, the Commission states that such stations will receive protection within their service contours during the transition period.⁷ A PAL protection area is the analog of this applied to the PAL tier. Thus a SAS will be required to support the concept of a geographical protection area in this case, and providing the same mechanism for PAL protection adds no functional complexity. Creating a similar protection structure for PAL may assist in the timely transition of Part 90 devices to operate within Part 96.

For these reasons, the Wireless Innovation Forum members request the FCC adopt a definition of “use” for PAL based on licensee-defined protection areas as suggested in the Forum's petition for reconsideration.

⁷ FCC Report and Order and Second Further Notice of Proposed Rulemaking 15-47, April 21, 2015, paragraph 408

The Commission requests comment on how an engineering definition of use would act to forestall gamesmanship while maintaining flexibility and not be burdensome for FCC policing functions.⁸ Forum members have no consensus recommendation to present to the Commission at this time.

2 The Wireless Innovation Forum members support the creation of a PAL secondary market.

The Commission asks in the Second FNPRM⁹ for comments on the development of a secondary market for PAL licenses which would support partitioning and disaggregation. Forum members support this, and note that the definition of use of PAL licenses described elsewhere in this document supports this notion. Since the SAS will be managing many thousands of census tracts and potentially many times that number of PAL protection areas, partitioning PAL licenses geographically or in frequency is not a technical obstacle to the functioning of the system. Furthermore, the existence of a secondary market for PAL licenses will help to establish the more predictable availability of PAL licenses for operators seeking to provide service in the PAL tier. For this reason, Forum members support the development of a secondary market subject only to the 40MHz aggregation limit.

3 Conclusion

Forum members urge the Commission to consider these reply comments to further enhance investment and innovation in the 3.5 GHz band. In particular, we respectfully request that the Commission should adopt a technical definition of “use” for PAL licenses based around licensee-defined protection areas. In addition, The Wireless Innovation Forum members support the

⁸ FCC Report and Order and Second Further Notice of Proposed Rulemaking 15-47, April 21, 2015, paragraph 423

⁹ FCC Report and Order and Second Further Notice of Proposed Rulemaking 15-47, April 21, 2015, paragraphs 434-435

creation of a PAL secondary market. Through these comment, Forum members believe the FCC will best accomplish its goal of making the 3.5 GHz a home for development of robust range of innovative services for American consumers.

Respectfully submitted,

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